Appln. No. 10/004,958
Amendment dated Jan. 24, 2006
Reply to Office Action dated Dec. 27, 2005
Docket No. 6818-28

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the instant application:

Listing of Claims:

1-6.   (Cancelled)

7.   (Currently Amended)   A high-speed scalable multiplier comprising:

a first signal input for receiving a first signal representing a [[a]] multiplicand value;

a second signal input for receiving a second signal representing a [[a]] multiplier value; and

a folding multiplier having circuitry for multiplying the multiplicand value times the multiplier value by

generating a first folding value and a second folding value based upon the multiplicand and multiplier values, the first folding value being equal to one half times a sum of the multiplicand value and the multiplier value, and the second folding value being equal to one half times a difference between the multiplicand value and the multiplier value,

generating a first square by squaring the difference between the first folding value and a fractional portion of a first scaling factor, the first scaling factor being equal to (a) one times a predetermined full scale value if the first folding value is greater than one half the full scale value and (b) zero if the first folding value is less than or equal to one half the full scale value,

generating a second square by squaring the difference between the second folding value and a fractional portion of a second scaling factor, the second scaling

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factor being equal to (a) one times the full scale value if the second folding value is greater than one half the full scale value and (b) zero if the second folding value is less than or equal to one half the full scale value,

generating a first product by multiplying the first folding value times the first scaling factor,

generating a second product by multiplying the second folding value times the second scaling factor,

generating a third square by squaring the fractional portion of the first scaling factor,

generating a fourth square by squaring the fractional portion of the second scaling factor, and

determining a folded product by generating a sum of the first square, the first product, and the fourth square, and subtracting from the sum the second square, the second product, and the third square.

8.   (Previously Presented)   The high-speed scalable multiplier of Claim 7, further comprising at least one additional folding multiplier and a conventional multiplier, each of said at least one additional folding multiplier and conventional multiplier being individually and selectively activatable.

9.   (Previously Presented) A high-speed scalable multiplier comprising:

at least one multiplier;

at least one folding multiplier having a first signal input for receiving a first signal representing a multiplicand value, a second signal input for receiving a second signal representing a multiplier value, and a folding multiplier having circuitry for multiplying the multiplicand value times the multiplier value by

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generating a first folding value and a second folding value based upon the multiplicand and multiplier, the first folding value being equal to an average of the multiplicand and the multiplier and the second folding value being equal to one half the difference between the multiplicand and the multiplier,

generating a first square by squaring the difference between the first folding value and a fractional portion of a first scaling factor, the first scaling factor being equal to (a) one times a predetermined full scale value if the first folding value is greater than one half the full scale value and (b) zero if the first folding value is less than or equal to one half the full scale value,

generating a second square by squaring the difference between the second folding value and a fractional portion of a second scaling factor, the second scaling factor being equal to (a) one times the full scale value if the second folding value is greater than one half the full scale value and (b) zero if the second folding value is less than or equal to one half the full scale value,

generating a first product by multiplying the first folding value times the first scaling factor,

generating a second product by multiplying the second folding value times the second scaling factor,

generating a third square by squaring the fractional portion of the first scaling factor,

generating a fourth square by squaring the fractional portion of the second scaling factor, and

determining a folded product by generating a sum of the first square, the first product, and the fourth square, and subtracting from the sum the second square, the second product, and the third square; and

at least one decoder for dynamically selecting between the at least one multiplier and at least one folding multiplier.

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10. (Previously Presented) The high-speed scalable multiplier of Claim 9, wherein the dynamic selection by said at least one decoder is based upon a comparison of respective power efficiencies of the at least one multiplier and the at least one folding multiplier.

11. (Previously Presented) A machine-readable storage medium, the storage medium comprising computer instructions for:

determining a first numerical value defining a multiplicand value, the determining of the multiplicand value based upon a first electrical signal;

determining a second numerical value defining a multiplier value, the determining of the multiplier value based upon a second electrical signal;

generating a first folding value equal to one half times a sum of the multiplicand and the multiplier;

generating a second folding value one-half times a difference between the multiplicand value and the multiplier value;

generating a first square based upon a squaring of a difference between the first folding value and a portion of a first scaling factor;

generating a second square based upon a squaring of a difference between the second folding value and a portion of a second scaling factor;

generating a third square based upon a squaring of the portion of the first scaling factor;

generating a fourth square based upon a squaring of the portion of the second scaling factor;

generating a first product based upon a product of the first folding value times the first scaling factor;

generating a second product based upon a product of the second folding value times the second scaling factor;

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generating a first sum by summing the first square, first product and fourth square;

generating a second sum by summing the second square, second product, and third square; and

generating a difference by subtracting the second sum from the first sum;

wherein the first factor is zero if the multiplicand is less than a predetermined threshold, and wherein the second factor is zero if the multiplier is less than the predetermined threshold.

12.   (Previously Presented)   The computer readable storage medium of Claim 11, further comprising a computer instruction for performing at least one of iteratively folding the multiplicand by dividing the first folding value by two if the multiplicand is greater than the predetermined threshold, and iteratively folding the multiplier by dividing the second folding value by two if the multiplier is greater than the predetermined threshold.

13.   (Cancelled)

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